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ABSTRACT

A study of the cognitive style characteristics of marketing education students focused on reasoning and problem solving. Field dependence theory measured particular cognitive styles in secondary school marketing education classrooms and estimated implications for reasoning and problem-solving behavior among currently enrolled students. The study sought to determine whether a particular cognitive style existed in selected secondary marketing education programs and whether a cognitive style had a relationship to the vocational objectives of secondary school marketing education students. Data collected from a population of 236 students in three secondary school marketing education programs in northern Georgia during the spring and fall of 1990 included demographic information and occupational objectives. The Group Embedded Figures Test was used to measure cognitive style. Descriptive statistics, correlations, t-tests, and a discriminant function analysis were applied to the data. It was found that: (1) students exhibited no single cognitive style; (2) students had a broad range of interests and abilities; (3) in accordance with theory, males were more field independent than females; and (4) despite a career objective requiring field independence, only 58 of 236 students' scores showed analytical abilities and interests. Three recommendations were made: (1) student interests in higher order thinking should be correlated to cognitive style; (2) relationships of field-dependence theory should be established; and (3) instructional practices to modify restructuring skills should be established. (Twelve references and 12 tables are included.) (NLA)

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Field-dependence Cognitive Styles in the Secondary Marketing Education Classroom, With Implications for Application-Level Reasoning and Problem Solving Behavior

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American Vocational Association

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Purpose of the Study

Does marketing education manifest a particular cognitive style? If it does, what are the implications for helping students develop occupationally relevant reasoning and problem solving abilities and interests? Because researchers suggest that a tentative answer to this question can be obtained, this study was undertaken to focus on selected variables that appear to relate to cognitive behavior and application-level interests.

After Osipow (1969) established a link between cognitive style and vocational orientation, Johansson (1971) concluded that John Holland's theory of vocational choice (Holland, 1973), because it predicts that the "best" occupation for an individual provides "congruence" between personality type and the demands in the work environment, amounts to a theory of vocational cognitive styles. The importance of these relationships is revealed through a general statement by Isaacson (1973) that "vocational counseling . . . implies ascertaining the characteristics of the individual and matching (them with) the known characteristics demanded by occupations" (p. 69). Thus, the ability of an instructor to relate cognitive attributes to career options could help youths make decisions about vocations at a time when critical skills needed for emerging careers involve mental abilities that many youths have not seen modeled in everyday life.

Because current demands being placed on vocational programs, including marketing education, include efforts to help students acquire "higher-order" reasoning skills, it is important to define these abilities. Miller (1990) described them as the four levels in Bloom's Taxonomy of the Cognitive Domain that lie above the second level, comprehension -- application, analysis, synthesis, and evaluation. Because of its applied nature, marketing education has a stake in helping students acquire the skills and habits that typify these levels, even if it means rethinking instructional processes that are used to deliver competency-based programs.

The third level, application, has several characteristics. One of them, "restructuring skills," is central to an instructor's ability to implement it. Bloom (1984) indicates that "restructuring" means using a framework, principle, or idea to organize a solution to a problem that was originally learned in a different context (p. 120). At this level students must persist toward a solution to a "new" problem without specific instructions from an instructor (p. 120). Yet, when students master these skills, they fulfill an important need -- independent mental functioning; Bloom believed that individuals who can not solve theor own problems "are not" an independent personalities (p. 41). At the same time, these skills address a critical business need -- employees who can solve problems with limited supervision.

Because of their importance, cognitive restructuring interests and abilities need to be understood. A partial knowledge of them can be found in the theories of cognitive style that emanate from a branch of cognitive psychology. By explaining how individuals "receive and process" information, these theories shed light on the role that perception plays in learning. As one of the most researched theories, Herman A. Witkin's theory of cognitive style is explained with a bi-polar model that is derived from knowledge about an individual's relative reliance on a field of reference. Field-independence describes those who exhibit independent functioning skills when solving problems that involve an complex and embedded field of reference: they also have skills and interests that involve cognitive restructuring. Those who are unable to overcome the effects of an imposed field have a field-dependence cognitive style and a social orientation. They may prefer to avoid cognitive restructuring activities. The larger framework for Witkin's theory is called psychological differentiation. (Witkin & Goodenough, 1981)

Witkin and Goodenough (1981) describes field-dependence theory as being "pervasive," meaning that field-independent and field-dependent cognitive styles contain attributes, including restructuring abilities and interests, that are manifest on a consistent basis "across tasks involving different sense modalities, as well as across tasks featuring spatial material and symbolic material" (p. 24). The origins of the two styles are explained as follows:

> "Whether or not there is a genetic contribution to individual differences in field dependence-independence, it is quite easy to account for the difference in cognitive style between hunting and farming groups on the basis of ecological, cultural, and socialization effects operating during the lifetime of the individual. There is an obvious and even dramatic correspondence between . . . child-rearing practices . . . (and the) development of a relatively field-independent cognitive style within a given cultural group . . . ." (p. 99)

Indeed, researchers found that competence at restructuring tasks relates to being encouraged to develop field-independence attributes more "rapidly" than is true for youths who are less skilled with them (Witkin & Goodenough, 1981, p. 66). Further, field-dependence is fostered by "child-rearing practices that encourage reliance on parental authority" (p. 82). Thus, cognitive restructuring abilities and interests are learned and then habituated, meaning that problem solving behavior is affected by experience and rewards systems.

From a developmental perspective, one's cognitive style becomes relatively stable during the late prepubertal years (Witkin & Goodenough, 1981, p. 68), with an individual's relative position within a group tending to remain consistent throughout life. Thus, a field-independent child will be, as compared to a particular reference group, relatively field-independent in adulthood and a field-dependent child will be field-dependent. However, in later life, there is a tendency for individuals to become relatively field-dependent regardless of their earlier orientation (Witkin, Dyk, Faterson, Goodenough, & Karp, 1962). Finally, males tend to be significantly more field-independent than females, with this difference manifesting itself during the high school years (Witkin & Goodenough, 1981, p 66).

From the above, it can be seen that the field-independent cognitive style includes reasoning patterns that seem correlated to the application level in Bloom's theory. It also seems that restructuring skills and independent mental functioning involve field-independence and the application level. Thus, it would appear that youths who are field-independent would be more likely to engage in occupations and activities that allow them to express these important aspects of their personalities and to therefore operationalize the notion of vocational "congruence" attributed to Holland's theory of vocational development mentioned earlier (Holland, 1973).

In a related topic, field-dependency theory has been related to vocational decision making with a college population. In a longitudinal study, Witkin (Witkin, Moore, Oltman, Goodenough, Friedman, Owen & Raskin, 1977) found that college students gravitate toward majors that reinforce their cognitive styles. This reinforces Holland's notion of congruency (Holland, 1973). reported Group Embedded Figures Test mean scores for students who left college before graduation (11.8), that completed college (11.6), and who entered graduate school (11.6).

Witkin's 1977 study (Witkin, Moore, Oltman, Goodenough, Friedman, Owen, & Raskin, 1977) revealed that the ability to relate field-dependence theory to vocational choice depends on the specificity of an occupational objective: Broad career goals fail to provide enough insight about the cognitive and social demands and make it difficult to identify cognitive style relationships. Yet, with reference to the study of undergraduate majors, he found that students enrolled in majors that complemented their cognitive styles. The field-independent style related to math, science, and vocational subjects such as drafting, electronics, and agriculture and the field-dependent style associated with careers in the social studies, elementary education, and vocational home economics. In these instances, Witkin felt that the social and mental demands of the majors reinforced the cognitive interests and personality orientation of the related cognitive style. Indeed, he concluded that

> "Choice of major was related to cognitive style . . . At the final college level and at the graduate school level, cognitive style made a significant contribution to choice of educational-vocational specialty beyond that made by SAT-V and SAT-M . . . ." (p. 208)

In the field of vocational education, Fritz (1981) found that re-enrollments in secondary vocational programs significantly related to cognitive style. He used the Group Embedded Figures Test (GEFT) to measure cognitive style. Scores on it range from a "high" field-dependent score of zero to a "high" field-independent score of eighteen. In his study, the most field-independent group had a mean score of 12.09 and the most field-dependent group had a mean score of 3.76. A class of marketing education students had a mean of 7.333. Because these groups were selected on the basis of their teachers' extreme performance on the same test, a group mean would not represent a full distribution of possible scores. Thus, in this study, while the marketing education teacher's score placed him in the field-dependent group, his students' scores were not statistically different from any other group in the study.

Because field-dependence measures stabilize during the early teenage years, an estimate of early twenties, it can be estimated that these scores would not have changed significantly since high school days. Finally, within the subgroups of his study, Witkin found that education majors had the lowest GEFT scores --Science majors had a mean of 12.9 and education 10.6.

Field-independence research suggests that instructor beliefs and expectations are critical for some youths. Yet, because many of the major developmental stages -- interest orientation, cognitive development, and cogniitve style -- have been passed by the time youths reach the marketing education program, it is important to understand these factors as they influence the learning environment, and also affect goal orientation in the marketing education classroom.

Fritz (1989) asked high school marketing education teachers to estimate the percentage of their students who used formal and abstract reasoning processes in their thinking. On average, they reported that slightly less than 30% of their students had these skills. They indicated that most students did not seem to use systematic steps to solve problems, neither did they consider several variables as they reasonable about a problem, nor were they able to generalize principles to new or different situations. Importantly, the teachers seemed to suggest that most of their students lacked the analytical skills associated with cognitive restructuring and field-independence. At the same time, they indicated that students preferred social activities over those involving analytical skills.

A lack of related experience and/or social reinforcements could explain why some youths do not have analytical interests. Yet, the more important question seems to relate methods that can be used to help these youths acquire the application-level reasoning skills they need for meaningful occupations. Bloom (1984) recommends that teachers develop "good problem solving skills" that allow students to practice the restructuring skills associated with the application level (p. 122). While considering this, teachers may benefit from knowing that students recognize the need to improve their mental skills.

A follow-up study of 1986-87 North Carolina marketing education program completers (Robertson, 1988), included an item that asked students to identify areas of study they wish they had learned more about while in school. Problem solving skills was one of them, along with math, reading, vocabulary, leadership, and general knowledge about a wide range of jobs. These findings support the need for instruction in the fundamental disciplines, but they also show that students recognize the occupational implications of higher-order cognitive skills shortly after leaving the secondary marketing education program.

In summary, the need for an investigation of the cognitive style characteristics of marketing education students seems warranted. Because it involves reasoning and problem solving characteristics, field-dependence theory can be used to see if a particular cognitive style exists in secondary school marketing education classrooms, and to estimate implications for reasoning and problem solving behavior among currently enrolled students.

Objectives

There were two major objectives for this study. They were:

1. To determine if a particular cognitive style exists in selected secondary school Marketing Education programs.

2. To determine if cognitive style has a relationship to the vocational objectives of secondary school Marketing Education students.

Based on these objectives, the following null hypotheses were addressed in this study:

Null Hypothesis One: Group Embedded Figures Test scores will not reveal a distinct cognitive style among the marketing education students participating in this study.

Null Hypothesis Two: There will be no statistically significant differences in the Group Embedded Figures Test mean scores of first and second year marketing education students.

Null Hypothesis Three: There will be no statistically significant differences in the Group Embedded Figures Test mean scores of female and male marketing education students.

Null Hypothesis Four: There will be no statistically significant relationship between the cognitive style demands of students' first and second occupational objectives and their Group Embedded Figures Test scores.

Methods and Procedures

The data were collected from three secondary school Marketing Education programs in northern Georgia during the spring and fall of 1990. Each instructor has extensive secondary teaching experience -- over ten years. Their programs are in comprehensive high schools. One program is in an urban environment, another in a rural setting, and the third is in a sub-urban community about thirty miles from a major urban center.

The Group Embedded Figures Test (GEFT) was selected to measure cognitive style because of wide use (over 5,000 studies) and satisfactory reliability -- .89 on test-retests over a three year period and a correlation of .82 between the two major sections in the test. (Consulting Psychologists Press, 1971, pp. 27 - 28)

When GEFT scores are grouped to compare information, the upper and lower 27% of the scores are used to, as Thorndike (1949) indicated, maximize differences between the groups. This technique has been commonly used to identify the field-dependent and field-independent groups. Those students with scores between these ends are commonly considered as "unclassified."

Demographic information and occupational objectives were collected on the form in Appendix A. Occupational objectives were coded by the investigator to reflect the major cognitive demands that seem indicated by the objective and the level of education the would be needed to achieve it. Decisions about the coding were based on professional judgements.

The population was 236 marketing education students enrolled in secondary Marketing Education programs in northern Georgia. Students were tested during the spring of 1990, and new program enrolles were examined in October, 1990. Data collection was limited to those in attendance on the testing dates.

The results were tabulated and processed through the services of the University of Georgia Educational Research Services Laboratory. Descriptive statistics, correlations, t-tests, and a discriminant function analysis were used to study the data.

Findings

Null Hypothesis One: Group Embedded Figures Test scores will not reveal a distinct cognitive style among the marketing education students participating in this study.

As shown on Table 1, the mean GEFT score for the population is toward the field-dependent end of the range and the median is slightly lower. Further, the standard deviation shows that there is a wide range of scores in the distribution. Because Witkin normally classifies scores as field-dependent or field-independent based on their position within the upper or lower 27% of the distribution, and because the mean was not in these ranges, the hypothesis was not rejected. Table 3 shows how scores were distributed across the range.

Table 1

GEFT Profile of Marketing Students

Mean	7.8898
Median	7.0000
Mid-Point	9.0000
Range	0 to 18
Standard Deviation	5.0568

If the group means of students are examined according to membership in an instructor's program, as in Table 2, statistical results do not indicate significant differences. The groups occupy similar positions on the range of scores.

Table 2

Analysis of Variance:
Student's GEFT Mean Scores X Instructor Group Membership

Instructor/ Program	N	Student's Mean Score	Standard Deviation
Urban	89	8.3933	5.4410
Rural	76	7.1184	4.8193
Sub-Urban	71	4.7682	4.7682
Total	236	7.8898	5.0568

No Two Groups are Significantly Different at the 0.05 Level

Table 3

Distribution of GEFT Scores

GEFT Value	Freq	PCT	Cum Pct		
0	10	4	4		
1	13	6	10	n=60	Most "FD"
2	17	7	17	Q1	Quarter of the
3	20	8	25		Range
4	12	5	31		
5	15	6	37	n=65	
6	22	9	46	Q2	
7	16	7	53		
8	15	6	59		
9	7	3	62	n=53	
10	9	4	66	Q3	
11	14	6	72		
12	8	3	75		
13	6	3	81		
14	11	5	86	n=58	
15	13	6	91	Q4	Most FI
16	13	6	97		Quarter of the
17	5	2	99		Range
18	3	1	100		

N = 236

Null Hypothesis Two: There will be no statistically significant differences in the Group Embedded Figures Test mean scores of first and second year marketing education students.

Table 4 reveals that there were no statistically significant differences between the GEFT mean scores for first and second year marketing education students. Thus, the hypothesis was not rejected.

Table 4

Oneway Analysis of Variance: GEFT x Years Enrolled

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	5.5428	2.7714	.1076	.8981*
Within Groups	233	6003.5928	25.7665		
Total	235			*p>.05	

Table 5 shows that there is a marginal difference in mean scores for the two groups, though it is not statistically significant. It also indicates that the standard deviations for the two groups are very similar.

Table 5

Mean Scores x Years Enrolled

Years Enrolled	N	Group Mean Score	Standard Dev.
First	222	7.8500	5.0594
Second	14	8.5000	4.9730
Total	236		

Null Hypothesis Three: There will be no statistically significant differences in the Group Embedded Figures Test mean scores of female and male marketing education students.

As shown on Table 6, there is a statistically significant difference between the GEFT mean scores for males and females. The mean score for females is statistically more field-dependent and the mean score for males is more field-independent. Thus, the hypothesis is rejected.

Table 6

Oneway Analysis of Variance: GEFT X Sex

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	418.8225	418.8225	17.5311	.0000*
Within Groups	234	5590.3131	23.8902		
*p<.05			Total	235	

Table 7 depicts the GEFT means and standard deviations by sex for the population.

Table 7

GEFT Means X Sex

Sex	N	GEFT Mean Score	Standard Deviation
Females	139	6.7770	4.5366
Males	97	9.4845	5.3524
Totals	236	7.8898	5.0568

Table 8

Discriminant Analysis: GEFT as Dependent Variable
Classification Results

Actual Group	Num. Cases	Predicted Group Membership: Field. Dept.	Field Indep.
Field-Dependent	34	21 61.8%	13 38.2%
Field-Independent	43	13 30.2%	30 69.8%

Percent of "Grouped" Cases Correctly Classified: 66.23%

Wilks' Lambda and Univariate F-Ratio

75 Degrees of Freedom

Variable	Wilks' Lambda	F	Significance
Sex	0.91330	7.119	0.0093*
Grade	0.98905	0.8305	0.3651
1st Occ. Obj.	0.99657	0.2583	0.6128
2nd Occ. Obj.	0.99657	0.2583	0.6128
Ed. Level -- 1st Occ. Obj.	0.94399	4.450	0.0382*
Ed. Level -- 2nd Occ. Obj.	0.97112	2.231	0.1395
Cog. Demands -- 1st Occ. Obj.	0.98119	1.438	0.2343
Cog. Demands -- 2nd Occ. Obj.	0.97722	1.748	0.1901

*p<.05

Table 8 shows a discriminant function analysis. When the upper and lower 27% of the scores are used to create group memberships based on GEFT, two statistically significant differences account for being in field-dependent or field-independent groups -- sex and the expected education level required to achieve the first occupational objective. The sex difference is the most significant means of classifying individuals into groups, with the most field-dependent group being largely female and the field-independent group mostly male.

Null Hypothesis Four: There is no statistically significant relationship between the cognitive style demands of students'first and second occupational objectives and their Group Embedded Figures Test scores.

Tables 10 and 11 show that the expected values for students GEFT and the dominant cognitive orientation of their occupational objectives are not statistically significant. Thus, for both the first and second occupational objectives, the hypothesis was not rejected.

Table 9

Dominant Cognitive Style Orientation of First Occupational Objectives

Dominant Orientation	n	%
Field-dependent	8	3%
Field-independent	94	40
Mixed	98	42
No Response	19	8
Unable to Classify	17	7
Total	236	100%

Table 10

Cross-Tabulation: GEFT X Dominant Cognitive Style Orientation For First Occupational Objective

Explained Values

Dominant Cognitive Orientation	% of GEFT: Field-depen. Group	% of GEFT: Field-Indep. Group	Row Total
Field-dependent	1.3	1.7	3 2.8%
Field-independent	22.0	27.0	49 45.8%
Mixed	24.7	30.3	55 51.4%
Column Total	48 44.9%	59 55.1%	107 100.0%

Chi-Square	D.F.	Significance
2.84519	2	0.2411*

*p>.05

Table 11

Cross-Tabulation: GEFT X Dominant Cognitive Style Orientation For Second Occupational Objective

Explained Values

Dominant Cognitive Orientation	% of GEFT: Field-depen. Group	% of GEFT: Field-Indep. Group	Row Total
Field-dependent	.4	.6	1 1.1%
Field-independent	15.1	18.9	34 38.6%
Mixed	23.5	29.5	53 60.2%
Column Total	39 44.3%	49 55.7%	88 100.0%

Chi-Square	D.F.	Significance
2.84519	2	0.2411*

*p>.05

Table 12

Dominant Cognitive Style Orientation of Second Occupational Objectives

Dominant Orientation	n	%
Field-dependent	2	1%
Field-independent	68	30
Mixed	94	40
No Response	53	22
Unable to Classify	19	8
Total	236	100%

Tables 9 and 12 display the dominant orientations of occupations. They show, for both first and second occupational objectives, that major task demands include both social and analytical skills, and that the second most often cited category includes analytical ability as a critical job requirement.

Discussion

Results from this study provide an initial insight to the relationships of field-dependence theory to secondary marketing education programs and to the cognitive structures that students bring to their learning situations. This discussion will summarize the major findings and offer a perspective on these topics.

While Table 1 shows that the mean score for the marketing education students' distribution of scores on the GEFT (see Table 2) does not indicate a specific cognitive style, similar to a finding by Fritz (1981). It does suggest, however, that the learning style needs of students are considerably different. The distribution also indicates that there may be a broad range of cognitive restructuring interests and abilities among students in these three programs.

Both the mean (7.890) and median (7.000) lie slightly below the mid-point of the range (9.000). The mean in the Fritz (1981) study was very similar (7.333). Based on Witkin's beliefs about the developmental nature of style, it could be expected that these scores reflect a stable condition. Consequently, the group has a collective style that is slightly more field-dependent than independent. However, because the mean falls close to the mid-point, and is in an area of the distribution that is thought of as unclear with regard to a particular style, a specific field-dependence cognitive style can not be said to exist for these students as a group, though specific individuals can be classified toward the extreme ends of the distribution.

The statistically significant differences found in the GEFT means for males and females comply with expectations from field-dependence theory (Witkin & Goodenough, 1981, p. 66). There are more females in this population (Females = 59% and Males = 41%), and their GEFT mean is 6.777, while that for males is 9.4845. A discriminant analysis showed that sex accounts for some of the difference in the mean scores. According to Witkin, this variability can be explained by childrearing practices, with males being more often encouraged to develop independence abilities while females are sometimes encouraged toward dependent relationships with significant others (Witkin & Goodenough, 1981, p. 82).

Finally, the cognitive demands inherent in occupational objectives were not statistically significant when related to students' GEFT scores. At the same time, implications for reasoning and problem solving ability seem evident.

If, as Witkin postulated, cognitive restructuring skills are molded by developmental experiences to a point where they become relatively stable, it appears that early educational experiences below the high school years play a critical role in helping youths form the skills and habits that they will need during adult life. And, because of the changing mix of occupational demands, along with the fact that jobs associated with higher levels of education often include more advanced reasoning and problem solving skills, the study suggests that vocational guidance needs to include the cognitive demands of work.

Many youths stated an initial occupational objective that seems to require field-independent skills, including cognitive restructuring abilities. Yet, within this population, as few as 25% of the students (58 out of 236) have scores on the GEFT which suggest the likelihood of interests and abilities that are clearly analytical. Yet, 40% (94 out of 236) stated occupational preferences which seem to require these abilities and interests.

This brings to the fore a finding by Fritz (1989) that most marketing education teachers viewed themselves as social rather than analytical, and that they felt that only 30% of their students possess analytical reasoning abilities. Yet, as Robertson (1987) found, marketing education program completers wish their teachers had provided them with more experiences related to problem solving ability. Clearly, the linkage of vocational aspirations to critical job skills seems to need examination.

If marketing education students are going to compete for jobs which meet contemporary demands in the market place, their instructors must make every effort to provide them with higher order learning experiences. This study shows that marketing education students seem to have a wide range of learning interests and abilities, meaning that instruction at the application level must take into account individual differences which manifest themselves

in the patterns used by students to bring meaning to experience and relevance to ideas.

Recommendations

Based on the findings in this study, the following recommendations are offered.

1. Student interests in higher order thinking should be correlated to cognitive style.

2. Relationships of field-dependence theory to specific vocations should be established so that the development of higher order skills is linked to what is known about cognitive processing behavior on the job.

3. The extent to which restructuring skills can be modified through instructional practices should be established.

Appendix A

Personal Data

Name:_____ Today's Date:_____
First Middle Last

Course Name:_____ Instructor:_____

Age:_____ Date of Birth:_____ Sex:_____
Day Month Year

Career Goal:_____ _____
First Choice Second Choice

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